

Using multimedia case studies to advance pre-service teacher knowing

Christina C. Pfister

Illinois State University ccpfiste@syr.edu

Daniel L. White

Roosevelt University dlwhite@roosevelt.edu

Joanna O. Masingila

Syracuse University jomasing@syr.edu

This paper uses Baxter Magolda's (1992) framework on ways of knowing to examine the effects of using multimedia case studies with beginning pre-service teachers (PSTs). Baxter Magolda referred to these ways of thinking as absolute, transitional, independent, and contextual. The written responses to two sets of tasks were analysed for 36 PSTs enrolled in their first education course at a large private university. The first task had the PSTs watch parts of a multimedia case and then discuss what they saw with peers and a facilitator. The second task had the subjects interact and make sense of a different multimedia case individually. Using Baxter Magolda's framework, each PST's responses to the events were coded. Results indicate that working together PSTs operated within contextual ways of knowing more often than they did when working alone. Implications for teacher educators are discussed.

Pre-service teachers, multimedia case studies, ways of knowing

After making a visit to a local classroom to conduct her first observation, Michelle (all names are pseudonyms), a beginning pre-service teacher (PST), approached one of the authors and said, "I went to my school and watched Mrs. K's class. I wrote down everything that happened." Michelle proceeded to display her notebook and asked, "Is this right?" Standing nearby was another beginning PST, Mike, who had conducted his observation on the same lesson. "I didn't do it that way. I wrote down only what the teacher did." Mike displayed his own notes and asked, "Is this right?" Even though both had observed the same lesson, they focused on different classroom events. In this way neither was wrong and both were right; they had constructed different notions of how to conduct the task of observing a lesson. As teacher educators, this prompted us to (a) begin to think about how PSTs actually approach their observations, (b) think about what Michelle and Mike meant when they asked "Is this right?" and (c) as instructors, discover ways to help our PSTs see a more complete picture of what is involved in teaching.

RATIONALE

Teacher education programs are comprised of different stages of preparation and the initial stages generally have PSTs conduct observations in classroom settings (White, 2005). Although Smith (1992) noted numerous shortcomings with field experiences, the logic behind observation remains simple – more time spent in an actual classroom better equips these PSTs with experiences that they can draw on in the future (Dewey, 1938).

The first two authors work with beginning (that is, first year) PSTs in courses designed to introduce them to teaching through college classroom experiences and observations in local P-12 classrooms. As Darling-Hammond (1997) noted, this balance of real classroom experiences with students, coupled with on-campus instruction is essential in preparing quality teachers who can better recognise and handle the complexities they may find in their future classrooms. Accordingly, the field experience classroom is intended to be an extension of their university class studies. The design of the course allows us to situate PSTs' learning in campus-based and field experiences. This is crucial to broadening student understandings because this learning is difficult to achieve in either setting alone (Darling-Hammond, 1997; Putnam and Borko, 2000).

PSTs generally come back from the field replete with anecdotes of their individual experiences. In our course, we create opportunities for PSTs to share the details of their experiences and prompt them to begin to interpret these experiences through larger educational philosophies. These opportunities assist PSTs to form shared understandings (Vygotsky, 1962) helping them gain a deeper appreciation for the events that have unfolded during their individual classroom observations.

Becoming a teacher involves the process of becoming a member of that community of practice. This means learning the language, theories, and daily practices of teachers. It is this process of becoming a teacher that is often complex for PSTs to understand because they initially lack the experience-based framework for making sense of what is happening in the classroom and for understanding what their host teachers are doing (Daring-Hammond and Rustique-Forrester, 1997). While PSTs generally want to express what they have experienced in their own observational settings, they are often unable to do so because they lack shared understandings of the complexities teachers face when facilitating classroom instruction. As Putnam and Borko (2000) noted about PSTs, "An important part of learning to teach is becoming enculturated into the teaching community – learning to think, talk, and act as a teacher" (p. 29). Therefore it is essential that PSTs begin to discuss what they are observing as important aspects of the classroom. This is problematic due to the distinct nature of their individual settings. Although the visits help connect class content to real-life applications, our PSTs lack a common experience on which to base their discussions (Masingila and Doerr, 2002). The problematic nature of this is inherent because PSTs are in distinct classrooms and have their own highly-individualised perspectives.

We believe that it is essential for PSTs, in discussions with their classmates who hold differing viewpoints, to acknowledge together the fact that teaching and learning exist in dynamic and fluid contexts. Gaining a sensitivity to the larger classroom context requires PSTs to be able to know and understand their experiences in different ways.

We chose to use multimedia case studies as a vehicle to allow our PSTs to construct common experiences to form a knowledge base for class discussions. In this paper we present (a) a theoretical discussion of the literature surrounding college students' ways of knowing and multimedia case studies, (b) a description of the multimedia technology we used, (c) the qualitative responses generated from student focus groups and content analysis of student work, and (d) implications for incorporating multimedia case studies as a tool for PSTs' learning.

THEORETICAL FRAMEWORK

Ways of Knowing

Several studies have focused on college students' development and tried to explain students' views of knowledge and ways of thinking. As described below, Perry (1970) places college students' views of knowledge on a continuum. Other researchers such as Belenky, Clinchy,

Goldberger and Tarule (1986) and Baxter Magolda (1992), in critique of Perry, constructed their studies differently with the result being that they moved away from this notion of a continuum to see student views of knowledge as falling into different domains. In this section we present the general ideas of each researcher and then describe our use of Baxter Magolda's work as a framework for this study.

Perry (1970) conducted a longitudinal study on male college students, documenting the cognitive developmental stages men go through as they progress from college freshmen to college seniors. Students in the earliest category are at the level Perry called "dualism". This stage is characterised by an expectation that there is a right answer for every problem and professors will provide this answer. It is the job of the student to learn this so-called 'right' answer. As students mature, they move toward "relativism". Here knowledge is seen as much more contextual, less absolute, and events must be interpreted in context in order to make sense.

Belenky et al. (1986), recognising the fact that Perry's (1970) study was limited due to its focus only on male college students, studied a group of women that included both college students and non-students. Their results suggest that women's understanding of knowledge cannot be placed on a continuum. Rather, women use five perspectives to "understand and make meaning of their worlds" (p. 15). These five perspectives are: silence, received knowledge, subjective knowledge, procedural knowledge, and constructed knowledge.

Baxter Magolda (1992), building upon Perry (1970) and Belenky et al. (1986) decided to interview both male and female students to discover their epistemological views of knowledge. She concluded that students structured their beliefs representing movement into and out of four domains of knowledge. This is not presented as a continuum as Perry suggested, but rather Baxter Magolda's model privileges each domain of knowing equally. She found that people use different ways of thinking at different times; thus the same individual may think in different domains even during the same conversation.

Baxter Magolda referred to these ways of thinking as absolute, transitional, independent, and contextual. When thinking in the **absolute knowing** category, students display certain characteristics. For example, students such as our PSTs (e.g., the two students in the introduction) may view learning as an event where the teacher is the source for all knowledge and the teacher's role is to emphasise the content of lessons. Knowledge is seen as complete and fixed. When thinking in this way, PSTs see things as right or wrong. While observing in their host schools, PSTs' thinking in this way may quickly cast classroom events in light of their personal views and deem events as categorically good or bad.

The next type of knowing is **transitional knowing**. When thinking in this way, PSTs recognise that it is not sufficient simply to receive knowledge; the PST must also understand the knowledge. In their college classroom, PSTs thinking in this way may classify behaviours as good or bad. This is different from absolute thinking because they can explicitly offer an opinion about what they observe. However, they do not provide justification for their views. When knowing in the **independent** way, PSTs are able to express that a teacher's actions are one possible way of doing things, but there may be other ways of doing things that the teacher has not chosen. Here, PSTs consider a teacher's actions in light of how the PSTs themselves would proceed. In **contextual** knowing, PSTs exchange ideas with others including their instructor, their host teacher, and their peers. Here, the PST situates his or her thoughts within the larger context of the classroom. He or she is open to the ideas of others as long as others can support their thoughts with clear evidence.

Although Baxter Magolda (1992) framed this movement as a journey, she is careful not to present students' perspectives in a linear, progressive fashion. Baxter Magolda allows us to frame student growth without privileging any domain. We believe that due to the complexities involved in teaching and learning it is important to help PSTs recognise all ways of knowing, most especially

we believe that it is essential that PSTs be able to operate within Baxter Magolda's realm of contextual knowing. It is in this realm that PSTs will encounter the complex world of real classrooms.

Multimedia Case Studies

Case studies have been used in the education of physicians, lawyers, and business professionals for more than one hundred years (Carter, 1999). In these contexts, cases are used because they allow young practitioners, together with classmates, to expand their knowledge within the safe environment of the classroom. As Putnam and Borko (2000) argue, case studies may also be important for teacher education: "Rather than putting teachers in particular classroom settings, cases provide vicarious encounters with those settings. This experience of the setting may afford reflection and critical analysis that is not possible when acting in the setting" (p. 8). Thus, by using case studies, teacher educators can set up opportunities for PSTs to examine, with peers, classroom events and issues that are similar to those they may see in their own future practice (Doerr and Thompson, 2004; Masingila and Doerr, 2002). In examining what is currently known from research on the use of case studies in teacher education, it seems clear that cases are used in a variety of ways. In particular, case studies are used to help new teachers develop their critical reasoning skills as well as increasing their understanding of the connection between theoretical and practical knowledge (Lundeberg, 1999). Practising teachers frequently consider problems and issues by talking, both formally and informally with other teachers (Pressley, 1999).

Typically, a multimedia case study consists of various data sources from a set of classroom lessons contained on a CD-ROM (Bowers and Doerr, 2003). The data sources on the multimedia case studies we used include (a) video clips of the lesson, the planning session, and the post-lesson teacher reflection, (b) transcripts synchronised to allow the viewer to read what is said as the video plays, and (c) an issues matrix that emphasises important pedagogical moments. It is the combination of these materials that allows PSTs working together to move from the limited scope of their personal observations toward gaining a shared understanding that captures the complexities of the classroom more fully. In this study we examine the use of multimedia cases with PSTs. In particular, our research examined the question: What role can multimedia case studies play in facilitating PSTs' ways of making sense of classroom observations?

METHODS

In order to address our research question of how multimedia case studies can be used to facilitate PSTs' ways of making sense of classroom observations, we designed two tasks: Event 1 and Event 2. Acknowledging that individuals learn and come to know the world differently in community, Event 1 allowed PSTs to work together in pairs, while Event 2 allowed for PSTs to work individually. It is possible to view the different ways of knowing as forming two realms. In this way, knowing in the A-T realm (absolute – transitional ways of knowing) would be more individualistic, while knowing in the I-C realm (independent – contextual ways of knowing) would be more contextual. Knowing in an individualistic way is characterised as being limited to only one perspective. Knowing in the more contextual realms is characterised by using multiple perspectives. When knowing in more contextual ways, PSTs are able to make judgments based on multiple perspectives.

For Event 1, we selected one multimedia case study and showed the entire class of PSTs portions of video of the classroom instruction and the teachers' reflection. While watching the video, PSTs were asked to list observations that they considered noteworthy. After watching the video clips, PSTs were asked to compare their observations with a partner. Together they noted similarities and differences in the observations that they had written down. Partner discussions were then shared with the whole class. Finally, PSTs were asked to respond to these questions on the class

website: (1) What did you see in the video clips when watching alone? (2) What did you find in the video clips when talking with a partner? (3) How do you see this exercise impacting what you observe the next time you are at your assigned school?

With the same group of PSTs we then used Event 2 at the next class meeting. Here PSTs were given a different case study to use outside of class. Given that the literature clearly indicates that beginning teachers often struggled with classroom management, we asked PSTs to use the features of the multimedia case study to locate what they deemed incidents of classroom management. We suggested that they consider accessing the issues matrix to assist them in this endeavor. In order to complete the assignment, PSTs were required to respond to questions on the class website. These questions were: (a) what did you see in the video clips? and (b) how do you see this exercise impacting what you observe the next time you are at your assigned school?

Participants

Out of a class of 53 beginning PSTs, 43 volunteered to allow written assignments from the introductory course, taught by one of the authors, to be analysed for this research. Of these PSTs, 36 responded to both assignments. The PSTs were enrolled in their first education course and the majority were second-semester, first-year students. All PSTs enrolled in the course were required to complete certain assignments. Assignments completed by volunteers were later analysed for this research. The instructor was not informed regarding which PSTs had chosen to participate and allow their work to be used for this research until after their final grades had been turned in.

Analysis

Guided by Baxter Magolda's (1992) framework, we coded the participants' written responses first to Event 1 and then Event 2 for emerging themes using qualitative methods (Bogdan and Biklen, 2002). We did this with the goal of categorising the PSTs' responses in order to locate their thinking within Baxter Magolda's framework after being exposed to each approach.

Again, Baxter Magolda's (1992) categories are not intended to be viewed as linear or hierarchical. The framework consists of four categories. As shown in Table 1, these categories are 'absolute knowing', 'transitional knowing', 'independent knowing', and 'contextual knowing'. As we have applied them, they represent how students made sense of Event 1 and Event 2.

Those comments we categorised as 'absolute knowing' were those that offered what seemed to be an uncritical report of teachers' actions in which all actions were taken as being correct without further analysis. Those comments that were categorised as 'transitional knowing' were those that uncritically deemed teacher actions as categorically good or bad without providing any justification. Comments categorised as 'independent knowing' were those that examined teacher decisions as one way of acting in light of how the PST thought he or she would proceed in a similar situation. Comments we categorised as contextual were those in which PSTs examined teacher decisions in light of context as they saw it. These comments were similar to those categorised as 'independent knowing', but additionally indicated a willingness to be open to the ideas of others if those views could be supported with evidence. A summary of how we interpreted Baxter Magolda's (1992) framework and sample quotes from our data is found in Table 1.

PSTs' written comments were placed twice in this framework; once after we coded their response to Event 1 and again after we coded their Event 2 response. We used the letters to indicate each category according to the following scheme A (Absolute knowers), T (Transitional knowers), I (Independent knowers), C (Contextual knowers). In the next section we illustrate what each of these ways of knowing looked like.

Table 1. Coding scheme for PST responses to Event 1 and Event 2¹

Way of Knowing	Our Interpretation of Baxter Magolda as Applied to This Study	Example Quote from Data
Absolute Knowing	PSTs report host teacher action as being “correct” and always “right”	I am sure [my] host teacher knows the most effective way to control an urban classroom... (Molly)
Transitional Knowing	PSTs categorically deem host teachers’ actions as good or bad without justification.	All of the other kids were talking while he [another child] was presenting, and you could tell they didn’t care too much for what he had to say, and I know they [the children] are young, but the teacher didn’t do anything about it which I thought was a little off track. (Jill)
Independent Knowing	PSTs examine teacher actions as one possible way of proceeding and cast teachers’ decisions in light of how they would proceed	The teacher ignored them [the students]. This tells the students that this is appropriate behavior because they are not getting in trouble for it. She [the teacher] should exercise her control over these student-to-student interactions to maintain authority and the respect of students. (Jeanne)
Contextual Knowing	PST situates his/her thoughts in context as he/she sees it, but is open to ideas of others if they can be supported with evidence	It was interesting to note the differences in what we [my classmate] and I recorded of our observations... Watching a video of an elementary classroom made me more attuned to student reactions to the teacher (teacher behavior). I have found that young children are much more open and explicit with their emotional responses and therefore are easier to read than a junior or senior [in high school] who has spent 10 years learning to mask emotions. (Jerry)

Categorisation of Knowers

Responses coded as absolute knowers (represented as A) were individuals who offered comments that suggested they cast classroom events simply by labelling anything the teacher did as ‘positive’ and within the realm of what the PST understands to be ‘normal’ for teaching. One comment classified as ‘absolute knowing’ was, “After observing the advice that was given to the student teacher [on the multimedia case study] it helps me to re-evaluate what is the correct way about classroom management” (sic). Another PST, Kim, whose comments were coded as A, stated, “I learned from the video clips that it is really hard to lecture to young children and have them pay attention. I also learned that when asking questions it’s a good idea to ask questions with leading words to what you want” (sic).

Next were comments that were labelled as ‘transitional knowing’ (T). These comments spoke of teacher actions as being good or bad without providing any justification for the label. One PST whose comment was classified as T, in response to a prompt asking him to describe the parts of the lesson he had focused his attention on, said, “Overall the teacher was a very demanding lady who certainly got the students’ attention, but not in the best way.” This comment is illustrative of one that makes a judgment on the teaching, but does not offer a rationale for the critique. Another PST made the following comment, “She [the teacher] was very monotone which, at times made her sound very condescending, which was not her intention.” Here the PST offers an opinion that defines how she does not think she would speak to students given the same situation.

Comments classified as ‘independent knowing’ (I) were those that examined decisions made by that teacher’s way of acting. These comments reflect how the PST thought he or she would respond to a similar set of circumstances. One PST commented, “The teacher ignored them [the students]. This tells the students that this is appropriate behaviour because they are not getting in trouble for it. She [the teacher] should exercise her control over these student-to-student interactions to maintain authority and the respect of students.” In this comment, we infer the PST

¹ Adapted from Baxter Magolda's (1992) Framework

thinks that she would have acted differently in the same or similar situation. She indicates that the teacher should have acted immediately to maintain more control over the students and the PST grounds her position by supplying the rationale that teachers should be in control of their classrooms. This PST's comments reflect her position that in order to maintain classroom management one must act immediately on any classroom event.

Comments classified as 'contextual knowing' (C) were those that reflected an exchange of ideas with others. These comments indicate that the PST can situate his or her thoughts in the context as he or she sees it, and is also open to the ideas of others as long as these ideas are grounded in evidence from the classroom. One PST's comment, coded as C, was, "Personally I felt that she [the teacher] was a bit disassociated from her students, which she may have been, or perhaps this is a tactic that works well for her particular environment." Another PST claimed that she has "decided to take more into account" after comparing her observations with those of her classmates. Talking with a partner helped to further ingrain these small details because it is likely no two people saw exactly the same thing. Each of these comments reflects an attention to the context of the classroom and incorporates judgment based on philosophies that are balanced by what may be deemed as other sound possible actions and alternatives regarding similar situations.

RESULTS

We tallied the numbers of PSTs that we had categorised at each broad level: A, T, I, and C. Table 2 shows the resulting number of PSTs whose coded comments placed them in each way of knowing after Event 1 and Event 2.

Table 2. Coding of responses

Baxter Magolda Domain of Knowing	Coded Response to Event 1				Coded Response to Event 2			
	A	T	I	C	A	T	I	C
# of PSTs	8	15	6	7	9	17	7	3

Our research question was designed to help us investigate how multimedia case studies could be used to facilitate PSTs' ways of making sense of classroom observations. Accordingly, we compared the coded responses from Event 1 and Event 2. These data are summarised in Table 2. According to Baxter Magolda (1992), ways of knowing should not be viewed as a hierarchy, but as domains that individuals move into and out of depending on the context. After completing Event 1, we found that more PSTs responded in ways that indicated that they were making sense (knowing) in independent and contextual ways than absolute and transitional ways. This contrasted with Event 2, that had a larger number of PSTs making sense (knowing) in absolute and transitional ways. Within this study, it is important to note that the PSTs' written comments represent only snapshots of the PSTs' way of knowing after each of the two events. The same PST might very well describe knowing in a different way when exposed to a different task.

DISCUSSION

In this section we discuss the results of this study and we offer discussion on possible reasons for the results that we found. Event 1 yielded responses representing PSTs' ways of knowing in Baxter Magolda's (1992) model. We anticipated that when working together, as in Event 1, more PSTs would fall into the contextual and independent realms, than when working alone, as in Event 2. We anticipated this would happen because the PSTs would have to share and justify their

comments to their classmates. Thus, in describing their rationales, they would, by virtue of the demands of the activity, be exhibiting the qualities outlined within the descriptions of contextual and independent domains.

That said, there are several implications for teacher educators. If PSTs are to make meaning from their experiences together, then they must have common experiences on which to build the shared and heightened understandings. It is by working together that PSTs are able to make meaning of their experiences and consider them in I-C ways. It is these more complex understandings that will help PSTs become enculturated into the community of practice that Putnam and Borko (2000) described. Multimedia case studies are a powerful tool for teacher educators to provide their students with these common experiences.

Because more PSTs' comments were categorised as being within the I-C realm after the group discussions in Event 1, it is plausible to infer that multimedia case studies should in conjunction with class time for PSTs to discuss their findings with each other and with their instructor. There is strong evidence that PSTs gain confidence in themselves and their teaching methods by talking through situations and exploring cases together with their peers (Barnett and Tyson, 1999).

Additionally, it is not enough just to provide opportunities for PSTs to talk with one another about the multimedia case study. It is logical to assume that PSTs will not be able to glean full understanding from simply interacting with a multimedia case study on their own and then discussing it with their peers. By having the course instructor act as the facilitator for discussion, much deeper understanding of the complex issues presented in the case is possible (Barnett and Tyson, 1999). This facilitator is most effective when he or she takes the role of pushing students to go further in their thinking and consider each other's viewpoints carefully (Levin, 1999). Therefore, through working with the facilitator and through discussion with classmates, these PSTs may be able to know in the independent and contextual ways; thus, placing themselves more in a position that acknowledges the complexities of classrooms. When on their own again they reverted to previous ways of thinking more toward the absolute and transitional realm. That said, teacher educators should design opportunities for PSTs to discuss classroom events with peers with the guidance of the teacher educator acting as a facilitator. It may appear that we are privileging more contextual ways of knowing over more absolute ways, but this is not the case. We are simply reporting that these interventions seem to allow PSTs to think in ways that more closely resemble the complexities in classrooms.

Future research might be focused in two areas. First, we recommend continuing to use multimedia case studies as a tool within Baxter Magolda's (1992) framework in order to locate PSTs' ways of knowing. Teacher educators should identify their PSTs' ways of knowing in order to design opportunities for them to construct new understandings of the context where they may be teaching.

Secondly, future research might be done to investigate whether multimedia case studies can help PSTs build more stable capacity to continue to know in the I-C realm. In the contextual way of knowing, this reliance on others "is replaced by an equalising of self and others" (p. 373). Therefore, "autonomy and connection are both required for complex forms of knowing" (p. 373). By discussing issues, PSTs gain confidence in their own ability to make decisions (Barnett and Tyson, 1999). Researchers should explore how opportunities such as incorporating the use of multimedia case studies in beginning PST education courses can open PSTs to the notion of privileging what they personally observe as they share their observations with classmates. Doing this might help teacher educators discover ways of helping PSTs to use multiple ways of knowing, particularly being able to know in the contextual realm when considering classroom events.

REFERENCES

Barnett, C. S., and Tyson, P. A. (1999). Case methods and teacher change: Shifting authority to build autonomy. In M. A. Lundeberg, B. A. Levin and H. L. Harrington (Eds.), *Who Learns What From Cases and How? The Research Base for Teaching and Learning With Cases* (pp. 53-69). Mahwah, NJ: Lawrence Erlbaum.

Baxter Magolda, M. B. (1992). *Knowing and Reasoning in College: Gender-Related Patterns in Students' Intellectual Development*. San Francisco: Jossey-Bass Publishers.

Belenky, M. F., Clinchy, B. M., Goldberg, N. R., and Tarule, J. M. (1986). *Women's Ways of Knowing: The Development of Self, Voice, and Mind*. New York: Basic Books.

Bogdan, R. C., and Biklen, S. K. (2002). *Qualitative Research for Education: An Introduction to Theory and Methods*. New York: Allyn and Bacon.

Bowers, J. S., and Doerr, H. M. (2003). Designing multimedia case studies for prospective mathematics teachers. Paper to appear in the *Journal of Educational Multimedia and Hypermedia* 12(2), 135-161.

Carter, K. (1999). What is a case? What is not a case? In M. A. Lundeberg, B. A. Levin and H. L. Harrington (Eds.), *Who Learns What From Cases and How? The Research Base for Teaching and Learning with Cases* (pp. 165-175). Mahwah, NJ: Lawrence Erlbaum.

Darling-Hammond, L. (1997). *Doing What Matters Most: Investing in Quality Teaching*. New York: National Commission on Teaching and America's Future.

Darling-Hammond, L. and Rustique-Forrester, E. (1997). *Investing in Quality Teaching: State-Level Strategies*. Paper presented to the Education Commission to the States, Colorado.

Dewey, J. (1938). *Experience and Education*. New York: Macmillan.

Doerr, H. M., and Thompson, T. (2004). Understanding teacher educators and their pre-service teachers through multimedia case studies of practice. *Journal of Mathematics Teacher Education*.

Levin, B. B. (1999). The role of the facilitator in case discussions. In M. A. Lundeberg, B. A. Levin and H. L. Harrington (Eds.), *Who learns what from cases and how? The Research Base for Teaching and Learning with Cases* (pp. 101-115). Mahwah, NJ: Lawrence Erlbaum.

Lundeberg, M. A. (1999). Discovering teaching and learning through cases. In M. A. Lundeberg, B. A. Levin and H. L. Harrington (Eds.), *Who Learns What From Cases and How? The Research Base for Teaching and Learning with Cases* (pp. 1-23). Mahwah, NJ: Lawrence Erlbaum.

Masingila, J. O., and Doerr, H. (2002). Understanding pre-service teachers' emerging practices through their analyses of a multimedia case study of practice. *Journal of Mathematics Teacher Education*, 5(3), 235-263.

Perry, W. G., Jr. (1970). *Forms of Intellectual and Ethical Development in the College Years: A Scheme*. Boston, MA: Holt, Rinehard and Winston.

Pressley, M. (1999). Commentary: The case for more and bigger cases. In M. A. Lundeberg, B. A. Levin and H. L. Harrington (Eds.), *Who Learns What From Cases and How? The Research Base for Teaching and Learning with Cases* (pp. 25-27). Mahwah, NJ: Erlbaum.

Putnam, R. T., and Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher*, 29(1), 4-15.

Smith, S. D. (1992). Professional partnerships and education change: Effective collaboration over time. *Journal of Teacher Education*, 43(4), 243-256.

Vygotsky, L. S. (1962). *Thought and Language* (E. Hanfmann and G. Vakar, Trans.). Cambridge, MA: MIT Press.

White, D. L. (2005). The importance of becoming a Something-ist: Exploring how pre-service teachers fashion theory. Unpublished Doctoral Dissertation: Syracuse University.